

WHAT IS CLAIMED IS:

1. A tube connecting apparatus, comprising:
a holding section which holds at least two flexible tubes to press them to a flat state;
a cutting section which cuts the tubes held in a flat state by the holding section;
an electrode section for supplying electric power for heating to the cutting section;
a cutting section movement unit which moves the cutting section between a tube cutting position and a tube non-cutting position;
a cutting section detecting sensor which detects the cutting section moved by the cutting section movement unit;
a holding section movement unit which moves the holding section to change relatively positions of the cut tubes such that end portions to be connected contact closely each other; and
a controlling section which controls power supply to the electrode section as well as movement of the cutting section movement unit and the holding section movement unit,
wherein, when the apparatus operates again after a halt, the controlling section judges necessity of reset operation in accordance with detecting information of the cutting section detected by the cutting section detecting sensor.

2. A tube connecting apparatus according to claim 1, wherein the controlling section has a non-volatile memory which memorizes connecting process information expressing a state of connecting process of the tubes,

and wherein, when the connecting process information memorized in the non-volatile memory is information expressing being in a state of connecting operation, and, when the cutting section detecting sensor detects the cutting section moved to the tube cutting position, the controlling section judges that the reset operation is necessary and controls the power supply to the electrode section as well as the movement of the cutting section movement unit and the holding section movement unit to carry out the reset operation.

3. A tube connecting apparatus according to claim 2, further comprising:

an engagement section which engages at least a part of the holding section to prohibit the holding section from opening movement out of the pressing state of the tubes; and

a holding section lock sensor which detects an engagement state of the engagement section against the holding section,

wherein, when the connecting process information memorized in the non-volatile memory is information expressing being in a state of connecting operation, and, when the cutting section detecting sensor detects the cutting section moved to the tube cutting position and the holding section lock sensor detects the holding section engaged with the engagement section, the controlling section judges that the reset operation is necessary and controls the power supply to the electrode section as well as the movement of the cutting section movement unit and the holding section movement unit to carry out the reset operation.

4. A tube connecting apparatus according to claim 1, further comprising:

an engagement section which engages at least a part of the holding section to prohibit the holding section from opening movement out of the pressing state of the tubes; and

a display section for displaying information,

wherein, when the controlling section judges that the reset operation is necessary, the controlling section controls the power supply to the electrode section as well as reset operation of the cutting section movement unit, the holding section movement unit and the engagement section, and controls the display section to display error indication.

5. A tube connecting apparatus according to claim 2, wherein, when a predetermined time lapsed from beginning of heating of the electrode section to the cutting section, the controlling section drives the non-volatile memory to memorize the information expressing

being in a state of connecting operation as the connecting process information.

6. A tube connecting apparatus according to claim 2, further comprising a position detecting sensor which detects that the holding section moved by the holding section movement unit reached a connection finish position for contacting closely the end portions of the cut tubes each other,

wherein, when the position detecting sensor detects that the holding section reached the connection finish position, the controlling section drives the non-volatile memory to memorize information expressing being in a state of non-connecting operation as the connecting process information.

7. A tube connecting apparatus according to claim 2, wherein the cutting section has a cutting plate which cuts the tubes, and wherein the non-volatile memory is capable of memorizing exchange information of the cutting plate, and the apparatus further comprising a cutting plate conveying section which conveys the cutting plate to the cutting section replaceably,

wherein, when the connecting process information memorized in the non-volatile memory is information expressing being in a state of non-connecting operation, and, when the exchange information memorized in the non-volatile memory is information expressing being unexchanged, the controlling section controls the cutting plate conveying section to convey the cutting plate to the cutting section.

8. A tube connecting apparatus according to claim 7, further comprising a cutting plate conveying section detecting sensor which detects the cutting plate conveying section,

wherein the cutting plate conveying section is movable so as to convey the cutting plate to the cutting section,

and wherein, when the cutting plate conveying section detecting sensor detects the moved cutting plate conveying section, the controlling section drives the non-volatile memory to memorize information expressing being exchanged as the exchange information

of the cutting plate.

9. A tube connecting apparatus according to claim 2, further comprising:

an engagement section which engages at least a part of the holding section to prohibit the holding section from opening movement out of the pressing state of the tubes; and

a holding section lock sensor which detects an engagement state of the engagement section against the holding section,

wherein the cutting section has a cutting plate which cuts the tubes, and wherein the non-volatile memory is capable of memorizing exchange information of the cutting plate,

and wherein, when the connecting process information memorized in the non-volatile memory is information expressing being in a state of non-connecting operation, and, when the holding section lock sensor detects the holding section engaged with the engagement section, the controlling section drives the non-volatile memory to memorize information expressing being unexchanged as the exchange information of the cutting plate.

10. A tube connecting apparatus according to claim 3, wherein the engagement section is a self-holding type solenoid into which a permanent magnet and a plunger are accommodated.

11. A tube connecting apparatus, comprising:

a holding section which holds at least two flexible tubes to press them to a flat state;

a cutting section which cuts the tubes held in a flat state by the holding section;

an electrode section for supplying electric power for heating to the cutting section;

a cutting section movement unit which moves the cutting section between a tube cutting position and a tube non-cutting position;

a holding section movement unit which moves the holding section to change relatively positions of the cut tubes such that end portions to be connected contact closely each other;

a controlling section which controls power supply to the electrode section as well as movement of the cutting section movement unit and the holding section movement unit; and

a display section for displaying information,

wherein the controlling section has a non-volatile memory which memorizes connecting process information expressing a state of connecting process of the tubes, and when the apparatus operates again after a halt, the controlling section judges necessity of reset operation in accordance with the connecting process information memorized in the non-volatile memory, and when the controlling section judges that the reset operation is necessary, the controlling section controls the display section to display error indication.

12. A tube connecting apparatus according to claim 11, further comprising an engagement section which engages at least a part of the holding section to prohibit the holding section from opening movement out of the pressing state of the tubes,

wherein, when the connecting process information memorized in the non-volatile memory is information expressing being in a state of connecting operation, the controlling section judges that the reset operation is necessary and controls power supply to the electrode section as well as reset operation of the cutting section movement unit, the holding section movement unit and the engagement section.